



SEQUENCE LISTING

<110> Van Mellaert, Herman  
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Joos, Henk

<120> RECOMBINANT PLANT EXPRESSING NON-COMPETITIVELY BINDING Bt INSECTICIDAL  
CRYSTAL PROTEINS

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<140> 09/661,061

<141> September 13, 2000

<150> PCT/EP90/00905

<151> 1990-05-30

<150> GB 89401499.2

<151> 1989-05-31

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<170> PatentIn Ver. 2.0

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Pro Tyr Asn Cys Leu Ser Asn Pro Lys Glu Ile Ile Leu Gly Glu Glu  
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Pro	Glu	Leu	Ser	Val	Ile	Pro	Gly	Val	Asn	Ala	Ala	Ile	Phe	Glu	Glu	930	935	940	
Leu	Glu	Glu	Arg	Ile	Phe	Thr	Ala	Phe	Ser	Leu	Tyr	Asp	Ala	Arg	Asn	945	950	955	960
Ile	Ile	Lys	Asn	Gly	Asp	Phe	Asn	Asn	Gly	Leu	Leu	Cys	Trp	Asn	Val	965	970	975	
Lys	Gly	His	Val	Glu	Val	Glu	Glu	Gln	Asn	Asn	His	Arg	Ser	Val	Leu	980	985	990	

Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Glu Val Arg Val Cys  
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Pro Gly Arg Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu Gly Tyr  
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Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn Thr Asp Glu  
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Leu Lys Phe Asn Asn Cys Val Glu Glu Glu Val Tyr Pro Asn Asn Thr  
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Tyr Thr Ser Arg Asn Arg Gly Tyr Asp Glu Ala Tyr Gly Asn Asn Pro  
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Ser Val Pro Ala Asp Tyr Ala Ser Val Tyr Glu Glu Lys Ser Tyr Thr  
1090 1095 1100

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1105 1110 1115 1120

Tyr Thr Pro Leu Pro Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe  
1125 1130 1135

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cagtatcaaa ctatcagaac tttggtagtt taataaaaaa acggaggtat ttt atg 236  
Met  
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Glu Glu Asn Asn Gln Asn Gln Cys Ile Pro Tyr Asn Cys Leu Ser Asn	
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cct gaa gaa gta ctt ttg gat gga gaa cgg ata tca act ggt aat tca	332
Pro Glu Glu Val Leu Leu Asp Gly Glu Arg Ile Ser Thr Gly Asn Ser	
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tca att gat att tct ctg tca ctt gtt cag ttt atg gta tct aac ttt	380
Ser Ile Asp Ile Ser Leu Ser Leu Val Gln Phe Met Val Ser Asn Phe	
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Val Pro Gly Gly Gly Phe Leu Val Gly Leu Ile Asp Phe Val Trp Gly	
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ata gtt ggc cct tct caa tgg gat gca ttt cta gta caa att gaa caa	476
Ile Val Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile Glu Gln	
70 75 80	
tta att aat gaa aga ata gct gaa ttt gct agg aat gct gct att gct	524
Leu Ile Asn Glu Arg Ile Ala Glu Phe Ala Arg Asn Ala Ala Ile Ala	
85 90 95	
aat tta gaa gga tta gaa aac aat tta aat ata tat gtg gaa gca ttt	572
Asn Leu Glu Gly Leu Glu Asn Asn Leu Asn Ile Tyr Val Glu Ala Phe	
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Lys Glu Trp Glu Glu Asp Pro Asn Asn Pro Glu Thr Arg Thr Arg Val	
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Ile Asp Arg Phe Arg Ile Leu Asp Gly Leu Leu Glu Arg Asp Ile Pro	
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Gln Ala Ala Asn Leu His Leu Ala Ile Leu Arg Asp Ser Val Ile Phe	
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Gly Glu Arg Trp Gly Leu Thr Thr Ile Asn Val Asn Glu Asn Tyr Asn	
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Arg Leu Ile Arg His Ile Asp Glu Tyr Ala Asp His Cys Ala Asn Thr	
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Tyr Asn Arg Gly Leu Asn Asn Leu Pro Lys Ser Thr Tyr Gln Asp Trp	
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Ile Thr Tyr Asn Arg Leu Arg Arg Asp Leu Thr Leu Thr Val Leu Asp	
230 235 240	
atc gcc gct ttc ttt cca aac tat gac aat agg aga tat cca att cag	1004
Ile Ala Ala Phe Phe Pro Asn Tyr Asp Asn Arg Arg Tyr Pro Ile Gln	
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cca gtt ggt caa cta aca agg gaa gtt tat acg gac cca tta att aat	1052
Pro Val Gly Gln Leu Thr Arg Glu Val Tyr Thr Asp Pro Leu Ile Asn	
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Phe Asn Pro Gln Leu Gln Ser Val Ala Gln Leu Pro Thr Phe Asn Val	
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Asn Leu Thr Ile Phe Thr Asp Trp Phe Ser Val Gly Arg Asn Phe Tyr	
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Trp Gly Gly His Arg Val Ile Ser Ser Leu Ile Gly Gly Gly Asn Ile	
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Thr Ser Pro Ile Tyr Gly Arg Glu Ala Asn Gln Glu Pro Pro Arg Ser	
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Arg Leu Leu Gln Gln Pro Trp Pro Ala Pro Pro Phe Asn Leu Arg Gly	
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Val Glu Gly Val Glu Phe Ser Thr Pro Thr Asn Ser Phe Thr Tyr Arg	
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Gly Arg Gly Thr Val Asp Ser Leu Thr Glu Leu Pro Pro Glu Asp Asn	
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Ser Val Pro Pro Arg Glu Gly Tyr Ser His Arg Leu Cys His Ala Thr	
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Phe Val Gln Arg Ser Gly Thr Pro Phe Leu Thr Thr Gly Val Val Phe	
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Ser Trp Thr His Arg Ser Ala Thr Leu Thr Asn Thr Ile Asp Pro Glu	
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Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe Arg Val Trp Gly Gly	
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acc tct gtc att aca gga cca gga ttt aca gga ggg gat atc ctt cga	1724
Thr Ser Val Ile Thr Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Arg	
485 490 495	
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Arg Asn Thr Phe Gly Asp Phe Val Ser Leu Gln Val Asn Ile Asn Ser	
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Pro Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg Tyr Ala Ser Ser Arg	
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Asp Ala Arg Val Ile Val Leu Thr Gly Ala Ala Ser Thr Gly Val Gly	
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Glu Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr Asp Phe Ser Asn Pro	
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Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu Ser Lys Leu Lys Ala	
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Tyr Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu Asp Ser Gln Asp Leu	
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Pro Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala Gln Ser Pro Ile Gly	
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Lys Cys Gly Glu Pro Asn Arg Cys Ala Pro His Leu Glu Trp Asn Pro	
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Glu Ala Leu Ala Arg Val Lys Arg Ala Glu Lys Lys Trp Arg Asp Lys	
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Ser Gln Glu Val Arg Val Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val	
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 1075 1080 1085  
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 Gln Glu Glu Tyr Glu Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr Asp  
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 1125 1130 1135  
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Ser Ser Ile Asp Ile Ser Leu Ser Leu Val Gln Phe Met Val Ser Asn  
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Phe Val Pro Gly Gly Gly Phe Leu Val Gly Leu Ile Asp Phe Val Trp  
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Gly Ile Val Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile Glu  
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Gln Leu Ile Asn Glu Arg Ile Ala Glu Phe Ala Arg Asn Ala Ala Ile  
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Ala Asn Leu Glu Gly Leu Glu Asn Asn Leu Asn Ile Tyr Val Glu Ala  
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Phe Lys Glu Trp Glu Glu Asp Pro Asn Asn Pro Glu Thr Arg Thr Arg  
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Val Ile Asp Arg Phe Arg Ile Leu Asp Gly Leu Leu Glu Arg Asp Ile  
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Pro Ser Phe Arg Ile Ser Gly Phe Glu Val Pro Leu Leu Ser Val Tyr  
145 150 155 160

Ala Gln Ala Ala Asn Leu His Leu Ala Ile Leu Arg Asp Ser Val Ile  
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Phe Gly Glu Arg Trp Gly Leu Thr Thr Ile Asn Val Asn Glu Asn Tyr  
180 185 190

Asn Arg Leu Ile Arg His Ile Asp Glu Tyr Ala Asp His Cys Ala Asn  
195 200 205

Thr Tyr Asn Arg Gly Leu Asn Asn Leu Pro Lys Ser Thr Tyr Gln Asp  
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Trp Ile Thr Tyr Asn Arg Leu Arg Arg Asp Leu Thr Leu Thr Val Leu  
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Asp Ile Ala Ala Phe Phe Pro Asn Tyr Asp Asn Arg Arg Tyr Pro Ile  
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Gln Pro Val Gly Gln Leu Thr Arg Glu Val Tyr Thr Asp Pro Leu Ile  
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Asn Phe Asn Pro Gln Leu Gln Ser Val Ala Gln Leu Pro Thr Phe Asn  
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Val Met Glu Ser Ser Ala Ile Arg Asn Pro His Leu Phe Asp Ile Leu  
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Tyr Trp Gly Gly His Arg Val Ile Ser Ser Leu Ile Gly Gly Gly Asn  
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Ile Thr Ser Pro Ile Tyr Gly Arg Glu Ala Asn Gln Glu Pro Pro Arg  
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Ser Phe Thr Phe Asn Gly Pro Val Phe Arg Thr Leu Ser Asn Pro Thr  
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Leu Arg Leu Leu Gln Gln Pro Trp Pro Ala Pro Pro Phe Asn Leu Arg  
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Gly Val Glu Gly Val Glu Phe Ser Thr Pro Thr Asn Ser Phe Thr Tyr  
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Arg Gly Arg Gly Thr Val Asp Ser Leu Thr Glu Leu Pro Pro Glu Asp  
 405 410 415

Asn Ser Val Pro Pro Arg Glu Gly Tyr Ser His Arg Leu Cys His Ala  
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Thr Phe Val Gln Arg Ser Gly Thr Pro Phe Leu Thr Thr Gly Val Val  
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Phe Ser Trp Thr His Arg Ser Ala Thr Leu Thr Asn Thr Ile Asp Pro  
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Glu Arg Ile Asn Gln Ile Pro Leu Val Lys Gly Phe Arg Val Trp Gly  
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Gly Thr Ser Val Ile Thr Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu  
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Arg Arg Asn Thr Phe Gly Asp Phe Val Ser Leu Gln Val Asn Ile Asn  
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Ser Pro Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg Tyr Ala Ser Ser  
 515 520 525

Arg Asp Ala Arg Val Ile Val Leu Thr Gly Ala Ala Ser Thr Gly Val  
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Gly Gly Gln Val Ser Val Asn Met Pro Leu Gln Lys Thr Met Glu Ile  
545 550 555 560

Gly Glu Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr Asp Phe Ser Asn  
565 570 575

Pro Phe Ser Phe Arg Ala Asn Pro Asp Ile Ile Gly Ile Ser Glu Gln  
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Pro Leu Phe Gly Ala Gly Ser Ile Ser Ser Gly Glu Leu Tyr Ile Asp  
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Lys Ile Glu Ile Ile Leu Ala Asp Ala Thr Phe Glu Ala Glu Ser Asp  
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Leu Glu Arg Ala Gln Lys Ala Val Asn Ala Leu Phe Thr Ser Ser Asn  
625 630 635 640

Gln Ile Gly Leu Lys Thr Asp Val Thr Asp Tyr His Ile Asp Gln Val  
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Ser Asn Leu Val Asp Cys Leu Ser Asp Glu Phe Cys Leu Asp Glu Lys  
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Arg Glu Leu Ser Glu Lys Val Lys His Ala Lys Arg Leu Ser Asp Glu  
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Arg Asn Leu Leu Gln Asp Pro Asn Phe Arg Gly Ile Asn Arg Gln Pro  
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Asp Val Phe Lys Glu Asn Tyr Val Thr Leu Pro Gly Thr Val Asp Glu  
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Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu Ser Lys Leu Lys  
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Ala Tyr Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu Asp Ser Gln Asp  
755 760 765

Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His Glu Ile Val Asn  
770 775 780

Val Pro Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala Gln Ser Pro Ile  
785 790 795 800

Gly Lys Cys Gly Glu Pro Asn Arg Cys Ala Pro His Leu Glu Trp Asn  
805 810 815

Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly Glu Lys Cys Ala His His  
820 825 830

Ser His His Phe Thr Leu Asp Ile Asp Val Gly Cys Thr Asp Leu Asn  
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Glu Asp Leu Gly Val Trp Val Ile Phe Lys Ile Lys Thr Gln Asp Gly  
850 855 860

His Ala Arg Leu Gly Asn Leu Glu Phe Leu Glu Glu Lys Pro Leu Leu  
865 870 875 880

Gly Glu Ala Leu Ala Arg Val Lys Arg Ala Glu Lys Lys Trp Arg Asp  
885 890 895

Lys Arg Glu Lys Leu Gln Leu Glu Thr Asn Ile Val Tyr Lys Glu Ala  
900 905 910

Lys Glu Ser Val Asp Ala Leu Phe Val Asn Ser Gln Tyr Asp Arg Leu  
915 920 925

Gln Val Asp Thr Asn Ile Ala Met Ile His Ala Ala Asp Lys Arg Val  
930 935 940

His Arg Ile Arg Glu Ala Tyr Leu Pro Glu Leu Ser Val Ile Pro Gly  
945 950 955 960

Val Asn Ala Ala Ile Phe Glu Glu Leu Glu Gly Arg Ile Phe Thr Ala  
965 970 975

Tyr Ser Leu Tyr Asp Ala Arg Asn Val Ile Lys Asn Gly Asp Phe Asn  
980 985 990

Asn Gly Leu Leu Cys Trp Asn Val Lys Gly His Val Asp Val Glu Glu  
995 1000 1005

Gln Asn Asn His Arg Ser Val Leu Val Ile Pro Glu Trp Glu Ala Glu  
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Val Thr Ala Tyr Lys Glu Gly Tyr Gly Glu Gly Cys Val Thr Ile His  
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Thr Gln Glu Glu Tyr Glu Gly Thr Tyr Thr Ser Arg Asn Gln Gly Tyr  
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Val Tyr Glu Glu Lys Ser Tyr Thr Asp Gly Arg Arg Glu Asn Pro Cys  
 1125 1130 1135

Glu Ser Asn Arg Gly Tyr Gly Asp Tyr Thr Pro Leu Pro Ala Gly Tyr  
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Val Thr Lys Asp Leu Glu Tyr Phe Pro Glu Thr Asp Lys Val Trp Ile  
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Leu Thr Ser Asn Arg Lys Asn Glu Asn Glu Ile Ile Asn Ala Val Ser	
1 5 10 15	

aat cat tcc gca caa atg gat cta tta cca gat gct cgt att gag gat	96
Asn His Ser Ala Gln Met Asp Leu Leu Pro Asp Ala Arg Ile Glu Asp	
20 25 30	

agc ttg tgt ata gcc gag ggg aac aat att gat cca ttt gtt agc gca	144
Ser Leu Cys Ile Ala Glu Gly Asn Asn Ile Asp Pro Phe Val Ser Ala	
35 40 45	

tca aca gtc caa acg ggt att aac ata gct ggt aga ata cta ggc gta	192
Ser Thr Val Gln Thr Gly Ile Asn Ile Ala Gly Arg Ile Leu Gly Val	
50 55 60	

ttg ggc gta ccg ttt gct gga caa cta gct agt ttt tat agt ttt ctt	240
Leu Gly Val Pro Phe Ala Gly Gln Leu Ala Ser Phe Tyr Ser Phe Leu	
65 70 75 80	

gtt ggt gaa tta tgg ccc cgc ggc aga gat cag tgg gaa att ttc cta	288
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Val	Gly	Glu	Leu	Trp	Pro	Arg	Gly	Arg	Asp	Gln	Trp	Glu	Ile	Phe	Leu	
				85					90					95		
gaa	cat	gtc	gaa	caa	ctt	ata	aat	caa	caa	ata	aca	gaa	aat	gct	agg	336
Glu	His	Val	Glu	Gln	Leu	Ile	Asn	Gln	Gln	Ile	Thr	Glu	Asn	Ala	Arg	
			100					105					110			
aat	acg	gct	ctt	gct	cga	tta	caa	ggc	tta	gga	gat	tcc	ttc	aga	gcc	384
Asn	Thr	Ala	Leu	Ala	Arg	Leu	Gln	Gly	Leu	Gly	Asp	Ser	Phe	Arg	Ala	
			115					120					125			
tat	caa	cag	tca	ctt	gaa	gat	tgg	cta	gaa	aac	cgt	gat	gat	gca	aga	432
Tyr	Gln	Gln	Ser	Leu	Glu	Asp	Trp	Leu	Glu	Asn	Arg	Asp	Asp	Ala	Arg	
			130				135				140					
acg	aga	agt	gtt	ctt	cat	acc	caa	tat	ata	gct	tta	gaa	ctt	gat	ttt	480
Thr	Arg	Ser	Val	Leu	His	Thr	Gln	Tyr	Ile	Ala	Leu	Glu	Leu	Asp	Phe	
					150					155					160	
ctt	aat	gcg	atg	ccg	ctt	ttc	gca	att	aga	aac	caa	gaa	gtt	cca	tta	528
Leu	Asn	Ala	Met	Pro	Leu	Phe	Ala	Ile	Arg	Asn	Gln	Glu	Val	Pro	Leu	
				165					170					175		
ttg	atg	gta	tat	gct	caa	gct	gca	aat	tta	cac	cta	tta	tta	ttg	aga	576
Leu	Met	Val	Tyr	Ala	Gln	Ala	Ala	Asn	Leu	His	Leu	Leu	Leu	Leu	Arg	
				180				185						190		
gat	gcc	tct	ctt	ttt	ggc	agt	gaa	ttt	ggg	ctt	aca	tcg	cag	gaa	att	624
Asp	Ala	Ser	Leu	Phe	Gly	Ser	Glu	Phe	Gly	Leu	Thr	Ser	Gln	Glu	Ile	
			195				200						205			
caa	cgc	tat	tat	gag	cgc	caa	gtg	gaa	cga	acg	aga	gat	tat	tcc	gac	672
Gln	Arg	Tyr	Tyr	Glu	Arg	Gln	Val	Glu	Arg	Thr	Arg	Asp	Tyr	Ser	Asp	
			210			215					220					
tat	tgc	gta	gaa	tgg	tat	aat	aca	ggc	cta	aat	agc	ttg	aga	ggg	aca	720
Tyr	Cys	Val	Glu	Trp	Tyr	Asn	Thr	Gly	Leu	Asn	Ser	Leu	Arg	Gly	Thr	
			225			230				235				240		
aat	gcc	gca	agt	tgg	gta	cgg	tat	aat	caa	ttc	cgt	aga	gat	cta	acg	768
Asn	Ala	Ala	Ser	Trp	Val	Arg	Tyr	Asn	Gln	Phe	Arg	Arg	Asp	Leu	Thr	
				245					250					255		
tta	gga	gta	tta	gat	cta	gtg	gca	cta	ttc	cca	agc	tat	gac	act	cgc	816
Leu	Gly	Val	Leu	Asp	Leu	Val	Ala	Leu	Phe	Pro	Ser	Tyr	Asp	Thr	Arg	
			260					265					270			
act	tat	cca	ata	aat	acg	agt	gct	cag	tta	aca	aga	gaa	gtt	tat	aca	864
Thr	Tyr	Pro	Ile	Asn	Thr	Ser	Ala	Gln	Leu	Thr	Arg	Glu	Val	Tyr	Thr	
			275				280					285				
gac	gca	att	gga	gca	aca	ggg	gta	aat	atg	gca	agt	atg	aat	tgg	tat	912
Asp	Ala	Ile	Gly	Ala	Thr	Gly	Val	Asn	Met	Ala	Ser	Met	Asn	Trp	Tyr	



290	295	300	
aat aat aat gca cct tgc ttc tct gcc ata gag gct gcg gct atc cga			960
Asn Asn Asn Ala Pro Ser Phe Ser Ala Ile Glu Ala Ala Ala Ile Arg			
305	310	315 320	
agc ccg cat cta ctt gat ttt cta gaa caa ctt aca att ttt agc gct			1008
Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala			
325	330	335	
tca tca cga tgg agt aat act agg cat atg act tat tgg cgg ggg cac			1056
Ser Ser Arg Trp Ser Asn Thr Arg His Met Thr Tyr Trp Arg Gly His			
340	345	350	
acg att caa tct cgg cca ata gga ggc gga tta aat acc tca acg cat			1104
Thr Ile Gln Ser Arg Pro Ile Gly Gly Gly Leu Asn Thr Ser Thr His			
355	360	365	
ggg gct acc aat act tct att aat cct gta aca tta cgg ttc gca tct			1152
Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser			
370	375	380	
cga gac gtt tat agg act gaa tca tat gca gga gtg ctt cta tgg gga			1200
Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly			
385	390	395 400	
att tac ctt gaa cct att cat ggt gtc cct act gtt agg ttt aat ttt			1248
Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe			
405	410	415	
acg aac cct cag aat att tct gat aga ggt acc gct aac tat agt caa			1296
Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln			
420	425	430	
cct tat gag tca cct ggg ctt caa tta aaa gat tca gaa act gaa tta			1344
Pro Tyr Glu Ser Pro Gly Leu Gln Leu Lys Asp Ser Glu Thr Glu Leu			
435	440	445	
cca cca gaa aca aca gaa cga cca aat tat gaa tct tac agt cac agg			1392
Pro Pro Glu Thr Thr Glu Arg Pro Asn Tyr Glu Ser Tyr Ser His Arg			
450	455	460	
tta tct cat ata ggt ata att tta caa tcc agg gtg aat gta ccg gta			1440
Leu Ser His Ile Gly Ile Ile Leu Gln Ser Arg Val Asn Val Pro Val			
465	470	475 480	
tat tct tgg acg cat cgt agt gca gat cgt acg aat acg att gga cca			1488
Tyr Ser Trp Thr His Arg Ser Ala Asp Arg Thr Asn Thr Ile Gly Pro			
485	490	495	
aat aga atc acc caa atc cca atg gta aaa gca tcc gaa ctt cct caa			1536
Asn Arg Ile Thr Gln Ile Pro Met Val Lys Ala Ser Glu Leu Pro Gln			
500	505	510	

ggt acc act gtt gtt aga gga cca gga ttt act ggt ggg gat att ctt	1584
Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu	
515 520 525	
cga aga acg aat act ggt gga ttt gga ccg ata aga gta act gtt aac	1632
Arg Arg Thr Asn Thr Gly Gly Phe Gly Pro Ile Arg Val Thr Val Asn	
530 535 540	
gga cca tta aca caa aga tat cgt ata gga ttc cgc tat gct tca act	1680
Gly Pro Leu Thr Gln Arg Tyr Arg Ile Gly Phe Arg Tyr Ala Ser Thr	
545 550 555 560	
gta gat ttt gat ttc ttt gta tca cgt gga ggt act act gta aat aat	1728
Val Asp Phe Asp Phe Phe Val Ser Arg Gly Gly Thr Thr Val Asn Asn	
565 570 575	
ttt aga ttc cta cgt aca atg aac agt gga gac gaa cta aaa tac gga	1776
Phe Arg Phe Leu Arg Thr Met Asn Ser Gly Asp Glu Leu Lys Tyr Gly	
580 585 590	
aat ttt gtg aga cgt gct ttt act aca cct ttt act ttt aca caa att	1824
Asn Phe Val Arg Arg Ala Phe Thr Thr Pro Phe Thr Phe Thr Gln Ile	
595 600 605	
caa gat ata att cga acg tct att caa ggc ctt agt gga aat ggg gaa	1872
Gln Asp Ile Ile Arg Thr Ser Ile Gln Gly Leu Ser Gly Asn Gly Glu	
610 615 620	
gtg tat ata gat aaa att gaa att att cca gtt act gca acc ttc gaa	1920
Val Tyr Ile Asp Lys Ile Glu Ile Ile Pro Val Thr Ala Thr Phe Glu	
625 630 635 640	
gca gaa tat gat tta gaa aga gcg caa gag gcg gtg aat gct ctg ttt	1968
Ala Glu Tyr Asp Leu Glu Arg Ala Gln Glu Ala Val Asn Ala Leu Phe	
645 650 655	
act aat acg aat cca aga aga ttg aaa aca gat gtg aca gat tat cat	2016
Thr Asn Thr Asn Pro Arg Arg Leu Lys Thr Asp Val Thr Asp Tyr His	
660 665 670	
att gat caa gta tcc aat tta gtg gcg tgt tta tcg gat gaa ttc tgc	2064
Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys	
675 680 685	
ttg gat gaa aag aga gaa tta ctt gag aaa gtg aaa tat gcg aaa cga	2112
Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg	
690 695 700	
ctc agt gat gaa aga aac tta ctc caa gat cca aac ttc aca tcc atc	2160
Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile	
705 710 715 720	
aat aag caa cca gac ttc ata tct act aat gag caa tcg aat ttc aca	2208

Asn Lys Gln Pro Asp Phe Ile Ser Thr	Asn Glu Gln Ser Asn Phe Thr	
725	730	735
tct atc cat gaa caa tct gaa cat gga tgg tgg gga agt gag aac att		2256
Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile		
740	745	750
acc atc cag gaa gga aat gac gta ttt aaa gag aat tac gtc aca cta		2304
Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu		
755	760	765
ccg ggt act ttt aat gag tgt tat ccg acg tat tta tat caa aaa ata		2352
Pro Gly Thr Phe Asn Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile		
770	775	780
ggg gag tcg gaa tta aaa gct tat act cgc tac caa tta aga ggt tat		2400
Gly Glu Ser Glu Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly Tyr		
785	790	800
att gaa gat agt caa gat tta gag ata tat ttg att cgt tat aat gcg		2448
Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala		
805	810	815
aaa cat gaa aca ttg gat gtt cca ggt acc gag tcc cta tgg ccg ctt		2496
Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu		
820	825	830
tca gtt gaa agc cca atc gga agg tgc gga gaa ccg aat cga tgc gca		2544
Ser Val Glu Ser Pro Ile Gly Arg Cys Gly Glu Pro Asn Arg Cys Ala		
835	840	845
cca cat ttt gaa tgg aat cct gat cta gat tgt tcc tgc aga gat gga		2592
Pro His Phe Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly		
850	855	860
gaa aaa tgt gcg cat cat tcc cat cat ttc tct ttg gat att gat gtt		2640
Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val		
865	870	880
gga tgc aca gac ttg cat gag aat cta ggc gtg tgg gtg gta ttc aag		2688
Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys		
885	890	895
att aag acg cag gaa ggt cat gca aga cta ggg aat ctg gaa ttt att		2736
Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile		
900	905	910
gaa gag aaa cca tta tta gga gaa gca ctg tct cgt gtg aag agg gca		2784
Glu Glu Lys Pro Leu Leu Gly Glu Ala Leu Ser Arg Val Lys Arg Ala		
915	920	925
gag aaa aaa tgg aga gac aaa cgt gaa aaa cta caa ttg gaa aca aaa		2832
Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Lys		

930	935	940	
cga gta tat aca gag gca aaa gaa gct gtg gat gct tta ttc gta gat			2880
Arg Val Tyr Thr Glu Ala Lys Glu Ala Val Asp Ala Leu Phe Val Asp			
945	950	955	960
tct caa tat gat aga tta caa gcg gat aca aac atc ggc atg att cat			2928
Ser Gln Tyr Asp Arg Leu Gln Ala Asp Thr Asn Ile Gly Met Ile His			
965	970		975
gcg gca gat aaa ctt gtt cat cga att cga gag gcg tat ctt tca gaa			2976
Ala Ala Asp Lys Leu Val His Arg Ile Arg Glu Ala Tyr Leu Ser Glu			
980	985		990
tta cct gtt atc cca ggt gta aat gcg gaa att ttt gaa gaa tta gaa			3024
Leu Pro Val Ile Pro Gly Val Asn Ala Glu Ile Phe Glu Glu Leu Glu			
995	1000		1005
ggt cac att atc act gca atc tcc tta tac gat gcg aga aat gtc			3069
Gly His Ile Ile Thr Ala Ile Ser Leu Tyr Asp Ala Arg Asn Val			
1010	1015		1020
gtt aaa aat ggt gat ttt aat aat gga tta aca tgt tgg aat gta			3114
Val Lys Asn Gly Asp Phe Asn Asn Gly Leu Thr Cys Trp Asn Val			
1025	1030		1035
aaa ggg cat gta gat gta caa cag agc cat cat cgt tct gac ctt			3159
Lys Gly His Val Asp Val Gln Gln Ser His His Arg Ser Asp Leu			
1040	1045		1050
gtt atc cca gaa tgg gaa gca gaa gtg tca caa gca gtt cgc gtc			3204
Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Ala Val Arg Val			
1055	1060		1065
tgt ccg ggg tgt ggc tat atc ctt cgt gtc aca gcg tac aaa gag			3249
Cys Pro Gly Cys Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu			
1070	1075		1080
gga tat gga gag ggc tgc gta acg atc cat gaa atc gag aac aat			3294
Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn			
1085	1090		1095
aca gac gaa cta aaa ttt aaa aac cgt gaa gaa gag gaa gtg tat			3339
Thr Asp Glu Leu Lys Phe Lys Asn Arg Glu Glu Glu Glu Val Tyr			
1100	1105		1110
cca acg gat aca gga acg tgt aat gat tat act gca cac caa ggt			3384
Pro Thr Asp Thr Gly Thr Cys Asn Asp Tyr Thr Ala His Gln Gly			
1115	1120		1125
aca gct gga tgc gca gat gca tgt aat tcc cgt aat gct gga tat			3429
Thr Ala Gly Cys Ala Asp Ala Cys Asn Ser Arg Asn Ala Gly Tyr			
1130	1135		1140

gag gat gca tat gaa gtt gat act aca gca tct gtt aat tac aaa 3474  
 Glu Asp Ala Tyr Glu Val Asp Thr Thr Ala Ser Val Asn Tyr Lys  
 1145 1150 1155

ccg act tat gaa gaa gaa acg tat aca gat gta aga aga gat aat 3519  
 Pro Thr Tyr Glu Glu Glu Thr Tyr Thr Asp Val Arg Arg Asp Asn  
 1160 1165 1170

cat tgt gaa tat gac aga ggg tat gtc aat tat cca cca gta cca 3564  
 His Cys Glu Tyr Asp Arg Gly Tyr Val Asn Tyr Pro Pro Val Pro  
 1175 1180 1185

gct ggt tat gtg aca aaa gaa tta gaa tac ttc cca gaa aca gat 3609  
 Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp  
 1190 1195 1200

aca gta tgg att gag att gga gaa acg gaa gga aag ttt att gta 3654  
 Thr Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Lys Phe Ile Val  
 1205 1210 1215

gat agc gtg gaa tta ctc ctc atg gaa gaa tag 3687  
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<210> 10

<211> 1228

<212> PRT

<213> Bacillus thuringiensis

<400> 10

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Asn His Ser Ala Gln Met Asp Leu Leu Pro Asp Ala Arg Ile Glu Asp  
 20 25 30

Ser Leu Cys Ile Ala Glu Gly Asn Asn Ile Asp Pro Phe Val Ser Ala  
 35 40 45

Ser Thr Val Gln Thr Gly Ile Asn Ile Ala Gly Arg Ile Leu Gly Val  
 50 55 60

Leu Gly Val Pro Phe Ala Gly Gln Leu Ala Ser Phe Tyr Ser Phe Leu  
 65 70 75 80

Val Gly Glu Leu Trp Pro Arg Gly Arg Asp Gln Trp Glu Ile Phe Leu

85

90

95

Glu His Val Glu Gln Leu Ile Asn Gln Gln Ile Thr Glu Asn Ala Arg  
100 105 110

Asn Thr Ala Leu Ala Arg Leu Gln Gly Leu Gly Asp Ser Phe Arg Ala  
115 120 125

Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asp Asp Ala Arg  
130 135 140

Thr Arg Ser Val Leu His Thr Gln Tyr Ile Ala Leu Glu Leu Asp Phe  
145 150 155 160

Leu Asn Ala Met Pro Leu Phe Ala Ile Arg Asn Gln Glu Val Pro Leu  
165 170 175

Leu Met Val Tyr Ala Gln Ala Ala Asn Leu His Leu Leu Leu Leu Arg  
180 185 190

Asp Ala Ser Leu Phe Gly Ser Glu Phe Gly Leu Thr Ser Gln Glu Ile  
195 200 205

Gln Arg Tyr Tyr Glu Arg Gln Val Glu Arg Thr Arg Asp Tyr Ser Asp  
210 215 220

Tyr Cys Val Glu Trp Tyr Asn Thr Gly Leu Asn Ser Leu Arg Gly Thr  
225 230 235 240

Asn Ala Ala Ser Trp Val Arg Tyr Asn Gln Phe Arg Arg Asp Leu Thr  
245 250 255

Leu Gly Val Leu Asp Leu Val Ala Leu Phe Pro Ser Tyr Asp Thr Arg  
260 265 270

Thr Tyr Pro Ile Asn Thr Ser Ala Gln Leu Thr Arg Glu Val Tyr Thr  
275 280 285

Asp Ala Ile Gly Ala Thr Gly Val Asn Met Ala Ser Met Asn Trp Tyr  
290 295 300

Asn Asn Asn Ala Pro Ser Phe Ser Ala Ile Glu Ala Ala Ala Ile Arg  
305 310 315 320

Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala  
325 330 335

Ser Ser Arg Trp Ser Asn Thr Arg His Met Thr Tyr Trp Arg Gly His  
340 345 350

Thr Ile Gln Ser Arg Pro Ile Gly Gly Gly Leu Asn Thr Ser Thr His  
355 360 365

Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser  
370 375 380

Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly  
385 390 395 400

Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe  
405 410 415

Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln  
420 425 430

Pro Tyr Glu Ser Pro Gly Leu Gln Leu Lys Asp Ser Glu Thr Glu Leu  
435 440 445

Pro Pro Glu Thr Thr Glu Arg Pro Asn Tyr Glu Ser Tyr Ser His Arg  
450 455 460

Leu Ser His Ile Gly Ile Ile Leu Gln Ser Arg Val Asn Val Pro Val  
465 470 475 480

Tyr Ser Trp Thr His Arg Ser Ala Asp Arg Thr Asn Thr Ile Gly Pro  
485 490 495

Asn Arg Ile Thr Gln Ile Pro Met Val Lys Ala Ser Glu Leu Pro Gln  
500 505 510

Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu  
515 520 525

Arg Arg Thr Asn Thr Gly Gly Phe Gly Pro Ile Arg Val Thr Val Asn  
530 535 540

Gly Pro Leu Thr Gln Arg Tyr Arg Ile Gly Phe Arg Tyr Ala Ser Thr  
545 550 555 560

Val Asp Phe Asp Phe Phe Val Ser Arg Gly Gly Thr Thr Val Asn Asn  
565 570 575

Phe Arg Phe Leu Arg Thr Met Asn Ser Gly Asp Glu Leu Lys Tyr Gly  
580 585 590

Asn Phe Val Arg Arg Ala Phe Thr Thr Pro Phe Thr Phe Thr Gln Ile  
595 600 605

Gln Asp Ile Ile Arg Thr Ser Ile Gln Gly Leu Ser Gly Asn Gly Glu  
610 615 620

Val Tyr Ile Asp Lys Ile Glu Ile Ile Pro Val Thr Ala Thr Phe Glu  
625 630 635 640

Ala Glu Tyr Asp Leu Glu Arg Ala Gln Glu Ala Val Asn Ala Leu Phe  
645 650 655

Thr Asn Thr Asn Pro Arg Arg Leu Lys Thr Asp Val Thr Asp Tyr His  
660 665 670

Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys  
675 680 685

Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg  
690 695 700

Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile  
705 710 715 720

Asn Lys Gln Pro Asp Phe Ile Ser Thr Asn Glu Gln Ser Asn Phe Thr



725

730

735

Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile  
740 745 750

Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu  
755 760 765

Pro Gly Thr Phe Asn Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile  
770 775 780

Gly Glu Ser Glu Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly Tyr  
785 790 795 800

Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala  
805 810 815

Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu  
820 825 830

Ser Val Glu Ser Pro Ile Gly Arg Cys Gly Glu Pro Asn Arg Cys Ala  
835 840 845

Pro His Phe Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly  
850 855 860

Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val  
865 870 875 880

Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys  
885 890 895

Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile  
900 905 910

Glu Glu Lys Pro Leu Leu Gly Glu Ala Leu Ser Arg Val Lys Arg Ala  
915 920 925

Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Lys  
930 935 940

Arg Val Tyr Thr Glu Ala Lys Glu Ala Val Asp Ala Leu Phe Val Asp  
945 950 955 960

Ser Gln Tyr Asp Arg Leu Gln Ala Asp Thr Asn Ile Gly Met Ile His  
965 970 975

Ala Ala Asp Lys Leu Val His Arg Ile Arg Glu Ala Tyr Leu Ser Glu  
980 985 990

Leu Pro Val Ile Pro Gly Val Asn Ala Glu Ile Phe Glu Glu Leu Glu  
995 1000 1005

Gly His Ile Ile Thr Ala Ile Ser Leu Tyr Asp Ala Arg Asn Val  
1010 1015 1020

Val Lys Asn Gly Asp Phe Asn Asn Gly Leu Thr Cys Trp Asn Val  
1025 1030 1035

Lys Gly His Val Asp Val Gln Gln Ser His His Arg Ser Asp Leu  
1040 1045 1050

Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Ala Val Arg Val  
1055 1060 1065

Cys Pro Gly Cys Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu  
1070 1075 1080

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn  
1085 1090 1095

Thr Asp Glu Leu Lys Phe Lys Asn Arg Glu Glu Glu Glu Val Tyr  
1100 1105 1110

Pro Thr Asp Thr Gly Thr Cys Asn Asp Tyr Thr Ala His Gln Gly  
1115 1120 1125

Thr Ala Gly Cys Ala Asp Ala Cys Asn Ser Arg Asn Ala Gly Tyr  
1130 1135 1140

Glu Asp Ala Tyr Glu Val Asp Thr Thr Ala Ser Val Asn Tyr Lys  
1145 1150 1155

Pro Thr Tyr Glu Glu Glu Thr Tyr Thr Asp Val Arg Arg Asp Asn  
1160 1165 1170

His Cys Glu Tyr Asp Arg Gly Tyr Val Asn Tyr Pro Pro Val Pro  
1175 1180 1185

Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp  
1190 1195 1200

Thr Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Lys Phe Ile Val  
1205 1210 1215

Asp Ser Val Glu Leu Leu Leu Met Glu Glu  
1220 1225